CLAIMS

We claim

1. A process for connecting two bodies forming parts of an electromechanical, fluid and optical microsystem, comprising:

forming, on a first body, a welding region;

forming, on a second body, an electrically conductive region having a first height;

forming, on said second body, a spacing region, near said electrically conductive region, said spacing region having a second height, smaller than said first height;

turning one between said first body and said second body upside down on top of the other; and

welding said electrically conductive region to said welding region by causing said electrically conductive region to reflow and collapse so that said first height becomes equal to said second height.

2. The process according to claim 1, wherein said electrically conductive region is of a low-melting eutectic material.

3. The process according to claim 2, wherein said low-melting eutectic material is formed by alternating layers of gold and tin.

4. The process according to claim 1, wherein said spacing region is of dielectric material.

5. The process according to claim 4, wherein said dielectric material is chosen from among a spun polymer, such as SU8, polyimide, a composite material formed by laminated polymer layers, such as a photosensitive stick foil, and oxynitrides.

6. The process according to claim 1, wherein said step of forming a spacing region comprises forming, in said spacing region, a delimiting cavity surrounding said electrically conductive region and having a greater volume than said electrically conductive region.

7. The process according to claim 1, wherein said spacing region surrounds an active region of an electromechanical microsystem.

8. The process according to claim 1, further comprising the step of forming a metal region between said second body and said electrically conductive region.

9. The process according to claim 8, wherein said welding region and said metal region are of a material chosen from among titanium, gold and nickel.

10. The process according to claim 1, wherein said step of welding said electrically conductive region is carried out at a temperature of between 200 and 300°C.

11. The process according to claim 1, further comprising the step of forming first electrical interconnection regions in electrical contact with said electrically conductive region and inside said second body.

12. The process according to claim 11, further comprising the step of forming second electrical interconnection regions in electrical contact with said welding region and inside said first body.

13. A device formed by a first body and a second body welded together through a mechanical and electrical connection structure, comprising:

an electrically conductive region welded between said first body and said second body; and

a spacing region arranged near said electrically conductive region and surrounding an active region of said electromechanical system.

14. The device according to claim 13, wherein said electrically conductive region is of a low-melting eutectic material.

15. The device according to claim 14, wherein said low-melting eutectic material is formed by alternating layers of gold and tin.

16. The device according to claim 13, wherein said spacing region is of dielectric material.

17. The device according to claim 16, wherein said dielectric material is chosen from among a spun polymer, such as SU8, polyimide, a composite material formed by laminated polymer layers, such as a photosensitive stick foil, and oxynitrides.

18. The device according to claim 13, wherein said spacing region forms a delimiting cavity surrounding said electrically conductive region.

19. The device according to claim 13 , further comprising a metal region which extends on top of said second body and beneath said electrically conductive region.

20. The device according to claim 19, wherein said welding region and said metal region are of a material chosen from among titanium, gold and nickel.

21. A method, comprising:

forming, on a first surface of a first body of semiconductor material, a first metal region;

forming, on a first surface of a second body of semiconductor material, a second metal region;

forming, on the first metal region, a welding region having a first height;

forming, on the first surface of the first or second body, a spacer having a second height, shorter than the first height;

positioning the first and second bodies such that their respective first surfaces face each other, with the first and second metal regions opposite each other; and

causing the welding region to reflow and bond with the second metal region, such that the first height becomes equal to the second height, and such that an electrical connection is formed between the first and second metal regions.

22. The method of claim 21 wherein the spacer is of dielectric material.

23. The method of claim 21 wherein the spacer defines a cavity within which is formed the first or second metal region.

24. The method of claim 21 wherein the spacer forms a cavity within which is formed a micro-mechanical structure.

25. The method of claim 21, further including the step of forming, in the first body, an electrical trace in electrical contact with the first metal region.

26. The method of claim 21, further including the step of forming, in the second body, an electrical trace in electrical contact with the second metal region.

27. A device comprising:

a first body of semiconductor material;

a first metal region, formed on a first surface of the first body;

a second body of semiconductor material spaced apart from the first body;

a spacer separating the first and second body and in contact with the first surface of the first body and a first surface of the second body;

a second metal region, formed on a first surface of the second body; and

a connection structure bonded to the first and second metal regions, forming thereby an electrical connection between the first and second metal regions.

28. The device of claim 27 wherein the connection structure is a low-melting eutetic material welded to the first and second metal regions.

29. The device of claim 27 wherein the spacer defines an enclosed space between the first and second bodies, within which is formed the first and second metal regions and the connection structure.

30. The device of claim 27 wherein the spacer defines an enclosed space between the first and second bodies, within which is formed a micromechanical structure.

31. The device of claim 27 wherein the first body of semiconductor material is formed of quartz.

32. The device of claim 31, further comprising a mirror formed on a second surface of the first body.

33. The device of claim 31, further comprising a diffractive lens formed on the second surface of the first body.